Mr. Whinery.

This is the average elevation corresponding to a difference of 0.1 in. in the barometer, and this multiplied by the difference in barometer readings, two-tenths, gives 94.3 × 2 = 188.6 ft., for the difference in elevation of the points of observation. While not absolutely correct, this method is more nearly so than any other equally simple. To overcome the principal source of trouble in the use of the barometer—its normal changes with the weather—the writer has used one or two simple and fairly satisfactory methods. These changes are usually quite regular and progressive. If, with the barometer hung up, readings be taken when the user first wakes up in the morning, and again after breakfast when he is ready to start out, and similarly when he stops an hour at noon for lunch and rest, some idea of the rate of change can be formed, and applied to correct the forenoon and afternoon observations in the field. For further and final correction, at the end of the trip, the records of the nearest weather bureau station may be applied, or, better still, those of a special barometer left at a permanent station and read by an assistant every hour of the day during the period.

It is rather common to sneer at the value of the barometer for such reconnaissance work, but when used with proper care, it is a most useful and reasonably reliable instrument. In a reconnaissance made by the writer, extending over about ten days, in the mountains of North Carolina, three aneroids were carried by the party, and at all important points the mean of their readings was used. For final corrections the mean of the barometer records of the weather offices at Knoxville and Atlanta was used. The results, when tested by actual levels, were remarkably satisfactory. The pedometer, used with judgment based on experience, is also a most valuable auxiliary on reconnaissance. Good reconnaissance work can only be done on foot or on horseback, but, in the latter case, provision must be made for having the horse led "around" on a considerable part of the trip. Except for a hasty trip to get the general lay of the country, a vehicle is useless; and fairly good maps may usually take the place of such a trip.

The author's remarks on the importance of care and deliberation in working out the best possible final location are pertinent. It may be safely asserted that there are in this country a surprisingly large number of railroads located so badly that, were it now possible, a competent engineer could afford to re-locate, at his own expense, the whole line, taking for his compensation a small percentage of what he could save in cost of construction and operation. But while the engineer is not infrequently to blame for faulty location, it is generally attributable to undue pressure upon him to hasten the work and to avoid expense. Very few employers, even among the abler and better informed class of railroad projectors,

appreciate the great economy and importance of careful and conscientious location, or have any adequate idea of the time and cost it involves. Mr. Whinery.

TABLE 1.—Height, in Feet, of a Column of Air Corresponding To a Tenth of An Inch in The Barometer at Different Temperatures and Elevations.

Barometer Reading in inches.	Temperature of the Air, in Degrees, Fahrenheit, Exposed Thermometer.																
	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°
27.8..	90.9	91.9	93.0	94.0	95.1	96.1	97.2	98.2	99.3	100.3	101.4	102.4	103.5	104.5	105.6	106.6	107.7
27.9..	90.6	91.6	92.7	93.7	94.8	95.8	96.9	97.9	99.0	100.0	101.0	102.1	103.1	104.2	105.2	106.3	107.3
28.0..	90.2	91.2	92.3	93.3	94.4	95.4	96.5	97.5	98.6	99.6	100.6	101.7	102.7	103.8	104.8	105.9	106.9
28.1..	89.9	90.9	92.0	93.0	94.1	95.1	96.2	97.2	98.3	99.3	100.3	101.4	102.4	103.4	104.5	105.5	106.5
28.2..	89.6	90.6	91.7	92.7	93.7	94.8	95.8	96.8	97.9	98.9	99.9	101.0	102.0	103.0	104.1	105.1	106.1
28.3..	89.3	90.3	91.4	92.4	93.4	94.5	95.5	96.5	97.6	98.6	99.6	100.6	101.7	102.7	103.7	104.7	105.8
28.4..	89.0	90.0	91.1	92.1	93.1	94.1	95.1	96.1	97.2	98.2	99.2	100.2	101.3	102.3	103.3	104.3	105.4
28.5..	88.6	89.6	90.7	91.7	92.7	93.8	94.8	95.8	96.9	97.9	98.9	99.9	101.0	102.0	103.0	104.0	105.0
28.6..	88.3	89.3	90.4	91.4	92.4	93.4	94.4	95.5	96.5	97.5	98.5	99.5	100.6	101.6	102.6	103.6	104.6
28.7..	88.0	89.0	90.1	91.1	92.1	93.1	94.1	95.2	96.2	97.2	98.2	99.2	100.2	101.2	102.2	103.2	104.2
28.8..	87.8	88.8	89.8	90.8	91.8	92.8	93.8	94.8	95.8	96.8	97.8	98.8	99.8	100.8	101.8	102.8	103.8
28.9..	87.4	88.4	89.4	90.4	91.4	92.5	93.5	94.5	95.5	96.5	97.5	98.5	99.5	100.5	101.5	102.5	103.5
29.0..	87.0	88.0	89.1	90.1	91.1	92.1	93.1	94.1	95.1	96.2	97.2	98.2	99.2	100.2	101.2	102.2	103.2
29.1..	86.8	87.8	88.8	89.8	90.8	91.8	92.8	93.8	94.8	95.9	96.9	97.9	98.9	99.9	100.9	101.9	102.9
29.2..	86.5	87.5	88.5	89.5	90.5	91.5	92.5	93.5	94.5	95.5	96.5	97.5	98.5	99.5	100.5	101.5	102.5
29.3..	86.2	87.2	88.2	89.2	90.2	91.2	92.2	93.2	94.2	95.2	96.2	97.2	98.2	99.2	100.2	101.2	102.2
29.4..	85.9	86.9	87.9	88.9	89.9	90.9	91.9	92.9	93.9	94.8	95.8	96.8	97.8	98.8	99.8	100.8	101.8
29.5..	85.6	86.6	87.6	88.6	89.6	90.6	91.6	92.6	93.6	94.5	95.5	96.5	97.5	98.5	99.5	100.5	101.5
29.6..	85.3	86.3	87.3	88.3	89.3	90.3	91.3	92.2	93.2	94.2	95.2	96.2	97.2	98.2	99.1	100.1	101.1
29.7..	85.1	86.1	87.0	88.0	89.0	90.0	91.0	91.9	92.9	93.9	94.9	95.9	96.9	97.9	98.8	99.8	100.8
29.8..	84.8	85.8	86.7	87.7	88.7	89.7	90.6	91.6	92.6	93.6	94.5	95.5	96.5	97.5	98.5	99.4	100.4
29.9..	84.5	85.5	86.4	87.4	88.4	89.4	90.3	91.3	92.3	93.3	94.2	95.2	96.2	97.2	98.2	99.1	100.1
30.0..	84.2	85.2	86.1	87.1	88.1	89.1	90.0	91.0	92.0	92.9	93.9	94.9	95.9	96.8	97.8	98.8	99.7

As a result, very few locating engineers can look back with satisfaction on a good deal of the work which they felt compelled, under pressure of time and expense, to do less carefully than their judgment dictated.

C. P. Howard, Assoc. M. Am. Soc. C. E. (by letter).—The writer has read Mr. Lavis' paper with much interest, it being the only paper he can recall which treats so fully this important subject. Though Mr. Lavis deals with the details of location rather than general principles, they are details which affect very vitally the general results. Mr. Howard.

The plan of allowing a locating engineer and an assistant locating engineer, besides instrumentmen, to each party seems to be a good one for a thorough preliminary line, which is really a topographic survey. The locating engineer can pick out the general route, while the assistant stays with the party and examines the